

REMARKS

Reconsideration of the above-mentioned application is respectfully requested.

The specification has been amended on page 1 to state that the patent application was abandoned on February 24, 2000 as suggested in the Office Action. Page 9 of the specification has been amended on line 15 to point out that the contact region at the bends of the spring contact fingers define "a plane contact surface which surface may be in the radial plane" such as the annular contact surface 58 shown in Fig. 3. Page 9 has also been amended to point out that the distance from the free end 40 of the socket body to the annular contact surface 58 is designated by the letter "ℓ". Fig. 4 has been amended to add the reference numeral 58, (which is also shown in Fig. 3), to designate the contact surface (subject to the Examiner's approval) and a copy of this figure with the proposed change in red is enclosed. Page 12 of the specification has been amended (and the drawings) to identify the three portions of the socket body 30, i.e., a forward or first tubular portion 32c and a rearward of second tubular portion 32d separated by a solid center section. Figures 11-13 have also been amended, subject to the Examiner's approval, to add reference numerals 32c and 32d to identify the first and

second tubular portions of the socket body. A copy of Figs. 11-13 is enclosed with the added numerals in red.

The distance "*ℓ*", shown in Fig. 4 as well as Figs. 1, 2, and 11-13, represents the distance from the free end of the socket body that the fingers engage or grasp the male pin. The specification points out that this distance "*ℓ*" can vary within the range of about .020 to .045 inches. This claimed feature is clearly shown in the drawings.

The Examiner's objections to claim 6 has been overcome by appropriate amendment.

REJECTION BASED ON 35 U.S.C. §112

The rejection of claims 2, 3, 5 and 7-21 based on 35 U.S.C. §112 has also been obviated by appropriate amendment of the claims. For example, the Examiner noted that in claims 2, 13 and 17 it is not clear what is meant by "the fingers grasp the male pin about .025 to .045 inches from the free end of the socket body."

Claims 2 and 13 have been amended to point out each of the fingers have or include a male pin engaging surface and that the male pin engaging surfaces are arranged to grasp or engage the male pin at a distance within a range of about .025 to .045 inches from the free end of the socket body or first blind bore. The distance designated "*ℓ*" in the drawings, between the free male

pin receiving end of the socket body and the location of the contact between the pin engaging surfaces of the spring fingers and the male pin is clear. Claim 17 has been amended in a similar fashion. Claims 2, 13 and 17 are now definite and in compliance with §112.

Claim 3 has been amended to call for each of the spring fingers to flare outwardly and forwardly of the pin engaging surfaces thereof. Claim 3 is now definite.

Claim 5 has been amended to call for the dimples to be staggered along the lengths of the individual fingers with the dimples being positioned at different axial distances from the free end of the first tubular portion of the socket body. The staggering of the dimples results in the positioning of the dimples at different axial distances from the free end of the first tubular portion of the socket body when the spring and socket body are assembled. Claim 5 is now believed to be definite.

Claim 7 has been amended to delete the word "contact" after "spring" and is now definite. Claim 8 was objected to as being confusing and in not providing an antecedent for the forward end of the spring. This claim has been amended to call for the forward portion of the spring to terminate axially inwardly (i.e., inwardly along the longitudinal axis 52) of the free male contact

receiving end of the first tubular portion of the socket body with the free end of the first tubular socket body portion being rolled over to extend radially inwardly beyond the forward portion of the spring. Claim 8 is now believed to clearly definitely define the invention in compliance with §112.

Claim 10 has been amended to positively call for the first tubular portion of the socket body member to define a tubular wall and this claim is now definite.

Claim 11 has been amended to clarify the bore being referred to. Claim 14 has been amended to point out that there is only one pin contact, i.e., a male pin contact.

Claim 18 was objected to as being indefinite and has been amended to overcome the insufficient antecedent problem.

Claim 20 has been amended to remove the redundancy and is now definite.

Claim 21 has been amended to call for the spring member and is now definite.

PRIOR ART REJECTION

The rejection of claims 1-3 and 6-9 in the Office Action, as being anticipated by Wymelenberg, is traversed. The Wymelenberg reference discloses a one-piece contact which is roll formed from a single flat metal blank. The end result is a split outer sleeve

forward portion with an elongated opening between the edges 21, a pair of contact arms folded inside the split sleeve, and a rearward portion in the form of crimp wings for attachment to an electrical conductor. In contrast, applicant's novel hoodless socket contact is a two-piece contact comprising a socket body with a forward tubular portion, a rearward portion, preferably also tubular, for receiving an electrical conductor and a center section, also preferably solid, separating the forward and rear portions. The second piece of the contact is a separate sleeve spring member positioned in the forward tubular portion of the socket body. The spring member may be secured in the forward socket body portion by, for example, a press fit or by crimping the forward tubular portion onto the spring member. Wymelenberg does not crimp the outer shell of his one-piece contact over the strips C which form the contact arms.

The advantages of applicant's novel two-piece hoodless socket over the Wymelenberg are many. First, the Wymelenberg one-piece socket terminal would never meet Mil Spec requirements because of the open gap along the outer sleeve. In addition, Mil Specs C-39029 and C-2250 require that the electrical conductor receiving end of the contact be capable of being crimped over the conductor with specified crimping tools. The Wymelenberg

terminal does not have a rearward tubular portion, i.e., cylindrical wire barrel. Instead it has crimp wings at the wire connection which would not meet the specifications.

Applicant's two-piece hoodless socket allows the same size of spring member to be used with different kinds of socket bodies to accommodate a great variety of connector applications, such as circular, Arinc, miniature, front and rear release connectors, etc. See Ex. A attached hereto.

In addition, applicant's two-piece construction is compatible with optimum annealing effectiveness.

For the best crimpability, after cold work, the wire barrels need to be annealed to release the stress, or to become a little bit soft after being heat-treated. During the process, it could happen that the parts are over-annealed or annealed at the wrong end.

Because applicant's hoodless contact is of a two-piece construction, the spring members do not need thorough annealing. Therefor softening the spring due to over-annealing the barrel is not a concern.

Wymelenberg's terminal is one a one-piece construction. If over-annealing the crimp end, the other end of the spring member could be weakened due to the heat easily transferred through a tiny metal piece.

Apart from the advantages of applicant's invention, the claims as amended clearly distinguish over Wymelenberg. Claim 1 calls for a two-piece contact comprising a socket body with a first (or forward) tubular portion with an axial hole therein and a second portion having an open wire receiving end for connection to a wire conductor. A separate spring forms the second piece of the contact. As pointed out previously, Wymelenberg does not disclose a two-piece contact. Also, Wymelenberg does not disclose a forward tubular portion, but instead a split sleeve with its disadvantages, i.e., unable to meet relevant specifications in the Aerospace and Defense Industries. Claim 1 is clearly patentable over Wymelenberg.

Claim 2, also distinguishes over Wymelenberg, in calling for the socket body to include a third portion in the form of a solid generally cylindrical section disposed between the first and second portions. In addition, Wymelenberg is silent on the distance from the free end of the socket body that the spring pin engaging surface engage the male pin and therefore does not teach or suggest this important limitation. Claims 3 and 8 are patentable over Wymelenberg for the reasons advanced with respect to claims 1 and 2.

Claim 7 calls for the first tubular portion of the socket body to be crimped onto the spring. As discussed previously, the outer shell of the Wymelenberg contact is not crimped over the contact arms C. Indeed with a one-piece construction there is no need to prevent separation of contact arms from the rest of the contact. Claim 7 is patentable.

Amended claim 9 calls for a two-piece female contact with one-piece being in the form of a cylindrically shaped body member having first and second tubular portions separated by a solid center portion with each of the first and second portions defining a blind bore therein. Wymelenberg discloses a one-piece contact which would be unacceptable for Aerospace and Defense Industry applications for the reasons pointed out above. Furthermore, neither section (16 or 14) of the Wymelenberg reference defines a blind bore. Claim 9 is patentable over Wymelenberg.

Claims 9-11, 14 and 17-19 were rejected as anticipated by Nestor et al. This reference teaches a four-piece connector and is clearly less relevant than the prior art referenced to in the background section of this application.

Applicant agrees that Nestor et al discloses a socket which includes a tubular body member, i.e., cup

portion 28, which defines a first blind bore and a rear stem portion 29. The stem 29, however, is externally threaded and does not define a blind bore. The embodiment shown in Figs. 7 and 8 of Nestor et al also does not have a second tubular portion which defines a blind bore, but instead discloses tabs (part of item 140) which are bent over the conductor. A contact relying on such tabs would not meet Mil Spec requirements as discussed previously. In the Nestor et al connector a male contact engaging spring 16 (wrapped around the rear portion of the sleeve 12) fits partially within the cup 28. A hood 30 fits over the spring and sleeve 12 to complete the assembly. The hood 30 functions much like the hood 26 of the prior art device shown in Fig. 2 of this application. The Wymelenberg terminal and the Nestor et al connector were apparently designed for automotive applications where once a connection is made it will remain in that condition for a long period of time, e.g., until the next maintenance or overhaul period. Contacts for aerospace and defense applications per military specs must be capable of mating and unmating hundreds of times.

The Nestor et al connector has many shortcomings in comparison to applicant's invention with cost being an obvious one.

Claim 9 clearly distinguishes over Nestor et al in calling for a two-piece socket contact with a socket body formed of a single part comprising one of the pieces and a spring member forming the other piece of the contact. In addition, the second tubular portion defines a blind bore for receiving an electrical conductor. Even if one treats the cup 28 and the separate hood or ring 30 of Nestor et al as a socket body member, the body member is not formed of a single part. Claim 9 is patentable over Nester et al.

With respect to claim 10, Nestor et al does not teach roll forming the tubular wall of the socket body into the rear portion of any spring. Claim 11 calls for the first blind bore to have an inwardly projecting shoulder against which the rear portion of the spring is seated. It is not believed that the back interior wall of the cup 28 can be considered to be as a shoulder and even if it is the other elements of claim 11 as set forth in claim 9 are missing from Nestor et al.

With respect to claim 14 the female contact is defined as being formed of only two-pieces with the tubular socket member consisting of a single part. The Nestor et al support member 14 consists of two parts, i.e., items 28 and 30, with a third part, i.e., the sleeve 12 holding the metal cylinder 16 in place within the

member 14. The claimed single part socket member as well as the second blind bore is missing from the four piece Nestor et al connector. Claim 14 is patentable.

While it is not conceded that structure providing distances called for in claim 17 is met by Nestor et al, this claim is patentable from the reasons advanced with respect to claim 14.

With respect to amended claim 18 it is not clear how Nestor et al can be construed to teach the forming of a sleeve spring member with a female coupling portion at a forward end. It would seem that the female coupling portion of Nestor et al item 16 extends the length of the item. Nevertheless, Nestor et al clearly does not teach forming a separate one-piece socket body with blind bores at each end. While Nestor et al teaches inserting the spring item 16 into the blind bore in the cup 28, it is not inserted entirely within that bore. Instead the hood 30 must then be inserted over the overhanging end of the item 16 after the ends thereof have been bent around the sleeve 12. Additionally there is no crimping of the wall of any second blind bore onto an electrical conductor in the Nestor et al patent. Claim 18 is patentable. Claim 19 is patentable for the reasons advanced with respect to claim 18.

Claims 12 and 13 are patentable over Wymelenberg for the reasons advanced with respect to claims 9 and 2.

Method claim 18, rejected as anticipated by Wymelenberg, calls for forming a sleeve spring member and a separate one-piece socket body with first and second tubular portions separated by a solid center section with blind bores (surrounded by walls) in each of the tubular portions. Wymelenberg does not teach forming two separate pieces or even a socket body with a solid center section. Claim 18 further calls for the step of inserting the spring member within the blind bore in the first tubular section and inserting a conductor into the blind bore in the second tubular section and crimping the wall surrounding that blind bore onto the electrical conductor. The method of claim 18 is completely different than the method taught by Wymelenberg and produces a superior hoodless socket contact especially useful in Aerospace and Military Applications.

Claims 19-21 are also patentable over Wymelenberg for the reasons advanced above.

The rejection of claims 1, 4 and 5 as being unpatentable over Wymelenberg in view of Trafton is respectfully traversed. To add the staggered dimples of Trafton to Wymelenberg would still result in a one-piece contact with its many shortcomings discussed previously.

Furthermore, Trafton teaches away from applicant's invention in which the spring fingers engage the male pin in close proximity to the free male contact receiving end of the socket body.

Claims 1, 4 and 5 are patentable over Wymelenberg in view of Trafton.

Claims 14-16 were rejected as unpatentable over Nestor et al in view of Sakurai. While Sakurai does show means such as the stopper arms 40 to prevent dislodgment of the female terminal from the housing, combining the teachings of this reference with Nestor et al would not result in applicant's invention as called for in claims 14-16. As pointed out previously (pages 18-20) the combined connector would still be formed of four separate pieces with no blind bore for receiving the electrical connector. Claims 14-16 are patentable over Nestor et al in view of Sakurai.

Applicant has developed a two-piece socket contact which not only meets the relevant military specifications essential for the Aerospace and Defense Industry, but provides a significant cost savings to users by eliminating a conventional precision hood with its attendant shortcomings (see pages 4-5 of the application) while at the same time reducing inventory requirements

since the spring can be used with many different types of socket bodies (see Ex. A).

Applicant has solved an important problem, made a significant contribution to this art and is entitled to the protection afforded by the claims now in this application which claims clearly distinguish the prior art.

This application is now believed to be in condition for allowance and such action is courteously solicited. If applicant's attorney can be of any further assistance please call the undersigned at the number provided.

Respectfully submitted,

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